

## **CLAIMS**

Please amend the claims as follows:

1. (Currently Amended) A non-chromate containing corrosion inhibiting coating composition comprising:
  - one or more organic binders; and
  - solid components comprising:
    - a praseodymium oxide selected from the group consisting of oxides, mixed oxides, solid solution oxides, hydrated oxides, hydroxides, and combinations thereof;
    - one or more substantially insoluble extenders selected from the group consisting of a neutral to slightly acidic generating extender, an acidic generating extender, and combinations thereof;
  - wherein the solid components comprise about 1 wt% to about ~~90~~ 40 wt% of the praseodymium oxide;
  - wherein the non-chromate containing composition is capable of curing naturally and, upon curing, is capable of generating a pH between about 2 and about 8 at an interface between the composition and a substrate.
2. (Previously Presented) The composition of claim 1 wherein the solid components further comprise a rare earth compound selected from the group consisting of rare earth oxides, mixed oxides, solid solution oxides, hydroxides, hydrated oxides, salts, triflates, complexes and combinations thereof.
3. (Previously Presented) The composition of claim 2 wherein the rare earth compound is an anhydrous or hydrated oxide.
4. (Previously Presented) The composition of claim 2 wherein the rare earth compound comprises one or more metal cations selected from the group consisting of praseodymium, terbium, cerium, samarium, yttrium, neodymium and combinations thereof.

5. (Previously Presented) The composition of claim 2 wherein the rare earth compound is selected from the group consisting of cerium oxide, cerium hydroxide, cerium mixed oxide, cerium oxide mixture, cerium salt, neodymium oxide, neodymium hydroxide, neodymium oxide mixture, neodymium salt, praseodymium oxide, praseodymium hydroxide, praseodymium mixed oxide, praseodymium oxide mixture, praseodymium salt, ytterbium oxide, ytterbium hydroxide, ytterbium oxide mixture, ytterbium salt, yttrium oxide, yttrium hydroxide, yttrium mixed oxide, yttrium oxide mixture, yttrium salt, terbium oxide, terbium hydroxide, terbium mixed oxide, terbium oxide mixture, terbium salt, and combinations thereof.
6. (Previously Presented) The composition of claim 2 wherein the rare earth compound is a praseodymium compound.
7. (Previously Presented) The composition of claim 1 wherein the praseodymium oxide is selected from the group consisting of praseodymium(III), praseodymium(III/IV), praseodymium(IV) oxides and mixtures thereof.
8. (Previously Presented) The composition of claim 1 wherein the praseodymium oxide is a praseodymium(III) oxide.
9. (Canceled).
10. (Previously Presented) The composition of claim 1 wherein the praseodymium oxide is a praseodymium(III/IV) oxide.
11. (Canceled).
12. (Previously Presented) The composition of claim 1 wherein the praseodymium oxide is a praseodymium(IV) oxide.
13. (Previously Presented) The composition of claim 1 wherein the solid components comprise about 1 wt% to about 28 wt% of the praseodymium oxide.

14. (Previously Presented) The composition of claim 1 wherein the solid components comprise about 3 wt% to about 28 wt% of the praseodymium oxide.
15. (Canceled).
16. (Previously Presented) The composition of claim 1 wherein at least one of the one or more substantially insoluble extenders is a sulfur, phosphorus or silicon oxyanion-containing salt.
17. (Original) The composition of claim 1 wherein the composition is selected from the group consisting of aqueous, solvent-based, and powder coating compositions.
18. (Previously Presented) The composition of claim 1 wherein the composition is an aqueous composition.
19. (Previously Presented) The composition of claim 1 wherein at least one of the one or more organic binders is selected from the group consisting of epoxy, urethane, urea, acrylate, alkyd, melamine, polyester, vinyl, vinyl ester, organo-silicone, organo-siloxane, organo-silicate, organo-sulfide, organo-sulfone, epoxy novolac, epoxy phenolic, amides, drying oils, and hydrocarbon polymers.
20. (Previously Presented) The composition of claim 1 wherein at least one of the one or more organic binders is an epoxy-based resin binder.
21. (Previously Presented) The composition of claim 1 wherein the solid components further comprise a material selected from the group consisting of linear and cyclic dextrans, triflic acid, triflates, acetates, talc, kaolin, organic-based ion exchange resins, and combinations thereof.

22. (Original) The composition of claim 21 comprising about 0.03 to about 5 wt% cyclodextrin, about 0.1 to about 0.5 wt% triflic acid, or about 0.1 to about 5 wt% ionic exchange resin.
23. (Withdrawn) The composition of claim 1 further comprising a material selected from the group consisting of gelatin and gelatin derivatives.
24. (Withdrawn) The composition of claim 23 comprising about 0.03 to about 5 wt% gelatin.
25. (Withdrawn) The composition of claim 1 further comprising a material selected from the group consisting of amino acids, amino acid derivatives and combinations thereof.
26. (Withdrawn) The composition of claim 25 wherein the amino acid is selected from the group consisting of glycine, arginine, and methionine.
27. (Withdrawn) The composition of claim 25 wherein the amino acid derivative is methionine sulfoxide or methionine methyl sulfoxide.
28. (Withdrawn) The composition of claim 25 comprising about 0.1 to about 5 wt% amino acid.
29. (Withdrawn) The composition of claim 2 wherein the rare earth compound is a rare earth carbonate or a rare earth triflate.
30. (Previously Presented) The composition of claim 1 wherein the solid components further comprise a coloring pigment.
31. (Original) The composition of claim 30 wherein the coloring pigment is  $\text{TiO}_2$ .
- 32-34. (Canceled)

35. (Currently Amended) A non-chromate containing corrosion inhibiting composition comprising:

one or more binders; and

solid components comprising:

about 1% to about 40% one or more rare earth ~~compounds~~ oxides; and

one or more substantially insoluble extenders selected from the group consisting of calcium sulfate, strontium sulfate, and combinations thereof;

wherein the non-chromate containing composition is capable of curing naturally and, upon curing, is capable of generating a pH between about 2 and about 8 at an interface between the composition and a substrate.

36-38. (Canceled).

39. (Previously Presented) The composition of claim 35, wherein the calcium sulfate is hydrous calcium sulfate or anhydrous calcium sulfate.

40. (Currently Amended) The composition of claim 35, wherein the solid components comprise about ~~± 60~~ 60 wt% to about 99 wt% of at least one of the one or more substantially insoluble extenders.

41. (Currently Amended) The composition of claim 35, wherein the solid components comprise about ~~45 60~~ 60 wt % to about 75 wt% of at least one of the one or more substantially insoluble extenders.

42. (Canceled).

43. (Previously Presented) The composition of claim 35 wherein at least one of the rare earth compounds comprises a metal cation selected from the group consisting of praseodymium, terbium, cerium, samarium, ytterbium, yttrium, neodymium and combinations thereof.

44. (Previously Presented) The composition of claim 35 wherein at least one of the one or more rare earth compounds is a praseodymium compound.
45. (Original) The composition of claim 44 wherein the praseodymium compound is selected from the group consisting of praseodymium(III), praseodymium(III/IV), praseodymium(IV) compounds and combinations thereof.
46. (Original) The composition of claim 44 wherein the praseodymium compound is a praseodymium(III) compound.
47. (Previously Presented) The composition of claim 44 wherein the praseodymium compound is a praseodymium(III) oxide, a praseodymium(III/IV) oxide or a praseodymium (IV) oxide.
48. (Original) The composition of claim 44 wherein the praseodymium compound is a praseodymium(III/IV) compound.
49. (Original) The composition of claim 44 wherein the praseodymium compound is a praseodymium(IV) compound.
50. (Previously Presented) The composition of claim 35 wherein the composition is selected from the group consisting of aqueous, solvent-based, and powder coating compositions.
51. (Previously Presented) The composition of claim 35 wherein at least one of the one or more binders is an organic polymer selected from the group consisting of epoxy, urethane, urea, acrylate, alkyd, melamine, polyester, vinyl, vinyl ester, organo-silicone, organo-siloxane, organo-silicate, organo-sulfide, organo-sulfone, polysulfide, epoxy novolac, epoxy phenolic, amides, drying oils, and hydrocarbon polymers.
52. (Previously Presented) The composition of claim 35 wherein at least one of the one or more binders is an epoxy-based resin binder.

53. (Previously Presented) The composition of claim 35 wherein at least one of the one or more binders is an inorganic polymer selected from the group consisting of silicone, siloxane and silicate polymers.

54. (Previously Presented) The composition of claim 35 wherein the solid components further comprise a coloring pigment.

55. (Original) The composition of claim 54 wherein the coloring pigment is  $\text{TiO}_2$ .

56. (Currently Amended) A non-chromate containing corrosion inhibiting primer composition comprising:

one or more organic binders; and

solid components comprising:

a praseodymium (III/IV) mixed oxide;

one or more substantially insoluble extenders selected from the group consisting of a neutral to slightly acidic generating extender, an acidic generating extender, and combinations thereof;

wherein the solid components comprise about 1wt% to about ~~90~~ 40 wt% of the praseodymium (III/IV) mixed oxide;

wherein the non-chromate containing composition is capable of curing naturally and, upon curing, is capable of generating a pH between about 2 and about 8 at an interface between the composition and a substrate.

57. (Original) The composition of claim 56 wherein the composition is selected from the group consisting of aqueous, solvent-based, and powder coating compositions.

58. (Previously Presented) The composition of claim 56 wherein at least one of the one or more organic binders is selected from the group consisting of epoxy, urethane, urea, acrylate, alkyd, melamine, polyester, vinyl, vinyl ester, organo-silicone, organo-siloxane, organo-silicate,

organo-sulfide, organo-sulfone, polysulfide, epoxy novolac, epoxy phenolic, amides, drying oils, and hydrocarbon polymers.

59. (Previously Presented) The composition of claim 56 wherein at least one of the one or more organic binders is an epoxy-based resin binder.

60. (Canceled).

61. (Previously Presented) The composition of claim 56 wherein the solid components further comprise a coloring pigment.

62. (Previously Presented) The composition of claim 61 wherein the coloring pigment is  $\text{TiO}_2$ .

63-66. (Canceled)

67. (Currently Amended) A non-chromate containing corrosion inhibiting coating composition comprising:

one or more binders; and

solid components comprising:

one or more rare earth element oxides selected from the group consisting of oxides, mixed oxides, solid solution oxides, hydrated oxides and hydroxides; and

a praseodymium oxide selected from the group consisting of oxides, mixed oxides, solid solution oxides, hydrated oxides, hydroxides, and combinations thereof;

one or more substantially insoluble extenders selected from the group consisting of a neutral to slightly acidic generating extender, an acidic generating extender, and combinations thereof;

wherein the praseodymium oxide is present in an amount of about 1 wt% to about ~~90~~ 40 wt% of the solid components;



wherein the non-chromate containing composition is capable of curing naturally and, upon curing, is capable of generating a pH between about 2 and about 8 at an interface between the composition and a substrate.

68. (Previously Presented) The composition of claim 67 wherein the praseodymium oxide is selected from the group consisting of  $\text{PrO}_2$ ,  $\text{Pr}_2\text{O}_3$ ,  $\text{Pr}_6\text{O}_{11}$  and combinations thereof.

69. (Canceled).

70. (Currently Amended) A non-chromate containing corrosion inhibiting coating composition comprising:

one or more binders; and

solid components comprising:

about 1 % to about 40 % one or more rare earth element oxides selected from the group consisting of oxides, mixed oxides, solid solution oxides, hydrated oxides, and hydroxides; and

one or more extenders selected from the group consisting of calcium sulfate, strontium sulfate, and combinations thereof;

wherein the non-chromate containing composition is capable of curing naturally and, upon curing, is capable of generating a pH between about 2 and about 8 at an interface between the composition and a substrate.

71-120. (Canceled)

121. (Currently Amended) A method for preparing a non-chromate containing coating composition comprising:

preparing a paint formulation; and

adding an effective corrosion-inhibiting amount of a rare earth ~~compound~~ oxide and one or more extenders selected from the group consisting of calcium sulfate, strontium sulfate, and combinations thereof to the paint formulation to produce a non-chromate containing coating composition;

wherein the rare earth oxide is present in an amount between about 1% to about 40% of the rare earth oxide and one or more extenders wherein the non-chromate containing composition is capable of curing naturally and, upon curing, is capable of generating a pH between about 2 and about 8 at an interface between the composition and a substrate.

122. (Previously Presented) The method of claim 121 further comprising pre-dispersing the rare earth compound with a dispersant.

123-131. (Canceled).

132. (Previously Presented) The method of claim 121 wherein the rare earth compound is a praseodymium(III) sulfate or a praseodymium(III/IV) oxide.

133. (Previously Presented) The method of claim 121 wherein the one or more extenders are substantially insoluble.

134-138. (Canceled)

139. (Previously Presented) The composition of claim 67 wherein at least one of the one or more rare earth element oxides is a rare earth praseodymium oxide or a rare earth terbium oxide.

140-142. (Canceled)

143. (Previously Presented) The composition of claim 1 wherein the praseodymium mixed oxide is  $\text{Pr}_6\text{O}_{11}$ .

144. (Previously Presented) The composition of claim 143 wherein the  $\text{Pr}_6\text{O}_{11}$  is present in amounts of about 1 wt% to about 28 wt% of the solid components.

145. (Previously Presented) The composition of claim 143 wherein the  $\text{Pr}_6\text{O}_{11}$  is present in amounts of about 3 wt% to about 28 wt% of the solid components.

146. (Canceled).

147. (Previously Presented) The composition of claim 35 wherein at least one of the rare earth compounds is an oxide, mixed oxide or combination thereof.

148. (Previously Presented) The composition of claim 147 wherein the solid components further comprise a second rare earth compound selected from the group consisting of rare earth oxides, mixed oxides, solid solution oxides, hydroxides, hydrated oxides, salts, triflates, complexes and combinations thereof.

149. (Previously Presented) The composition of claim 56 wherein the solid components further comprise an additional rare earth compound selected from the group consisting of rare earth oxides, mixed oxides, solid solution oxides, hydroxides, hydrated oxides, salts, triflates, complexes and combinations thereof.

150. (Previously Presented) The composition of claim 67 wherein at least one of the one or more rare earth element oxides is selected from the group consisting of  $Y_2O_3$ ;  $La_2O_3$ ,  $CeO_2$ ,  $Pr(OH)_3$ ,  $PrO_2$ ,  $Pr_2O_3$ ,  $Pr_6O_{11}$ ,  $Nd_2O_3$ ,  $Sm_2O_3$ ,  $Tb_4O_7$ , and  $Yb_2O_3$ .

151. (Previously Presented) The composition of claim 70 wherein at least one of the one or more rare earth element oxides is an anhydrous praseodymium oxide.

152-153. (Canceled).

154. (Withdrawn) A corrosion inhibiting primer composition comprising:  
a rare earth triflate or a rare earth carbonate; and  
a binder.

155. (Withdrawn) The composition of claim 154 wherein the rare earth triflate or rare earth carbonate comprises one or more metal cations selected from the group consisting of

praseodymium, terbium, cerium, samarium, ytterbium, yttrium, neodymium and combinations thereof.

156. (Withdrawn) The composition of claim 154 wherein the rare earth triflate is a praseodymium triflate or a terbium triflate and the rare earth carbonate is a praseodymium triflate or a terbium triflate.

157. (Withdrawn) The coating composition of claim 154 further comprising one or more metal cations selected from the group consisting of Group 1A, Group 2A, Group 3A, and Group 3B metals.

158. (Withdrawn) The coating composition of claim 154 further comprising one or more anions selected from the group consisting of acetate, borate, carbonate, nitrate, phosphate, phosphonate, sulfate, triflate, and EDTA.

159. (Withdrawn) The composition of claim 154 further comprising a second rare earth compound selected from the group consisting of rare earth oxides, mixed oxides, solid solution oxides, hydroxides, hydrated oxides, salts, triflates, complexes and combinations thereof.

160. (Previously Presented) The method of claim 121 wherein the rare earth compound is a praseodymium oxide or praseodymium mixed oxide.

161. (Previously Presented) The method of claim 160 wherein the praseodymium mixed oxide is  $\text{Pr}_6\text{O}_{11}$ .

162. (Withdrawn) The method of claim 121 further comprising adding a material selected from the group consisting of amino acids, derivatives of amino acids, and combinations thereof to the paint formulation.

163. (Withdrawn) The method of claim 121 further comprising adding a material selected from the group consisting of gelatin, gelatin derivatives, and combinations thereof to the paint formulation.

164. (Currently Amended) A method for preparing a non-chromate containing coating composition comprising:

preparing a paint formulation comprised of an organic binder; and

adding an effective corrosion-inhibiting amount of a solid component comprising:

a praseodymium compound selected from the

group consisting of oxides, mixed oxides, solid solution oxides, hydrated oxides, hydroxides, and combinations thereof to the paint formulation to produce a coating composition

one or more substantially insoluble extenders selected from the group consisting of a neutral to slightly acidic generating extender, an acidic generating extender, and combinations thereof;

wherein the praseodymium compound comprises about 1 wt% to about ~~90~~ 40 wt% of the solid components;

wherein the non-chromate containing composition is capable of curing naturally and, upon curing, is capable of generating a pH between about 2 and about 8 at an interface between the composition and a substrate.

165. (Previously Presented) The method of claim 164 wherein the praseodymium compound is  $\text{Pr}_6\text{O}_{11}$ .

166. (Previously Presented) The method of claim 164 wherein the solid components further comprise an additional rare earth compound selected from the group consisting of rare earth oxides, mixed oxides, solid solution oxides, hydroxides, hydrated oxides, salts, triflates, complexes and combinations thereof to the paint formulation.

167. (Canceled).

168. (Previously Presented) The method of claim 164 further comprising the step of pre-dispersing the praseodymium compound with a dispersant.

169-183. (Canceled).

184. (Previously Presented) The composition of claim 7 wherein the solid components further comprise one or more extenders selected from the group consisting of a neutral to slightly acidic generating extender.

185. (Canceled).

186. (Previously Presented) The composition of claim 184 wherein at least one of the one or more extenders is calcium sulfate.

187. (Previously Presented) The composition of claim 186 wherein the calcium sulfate is selected from the group consisting of hydrous calcium sulfate, anhydrous calcium sulfate and combinations thereof.

188-190. (Canceled).

191. (Previously Presented) The method of claim 121 wherein the rare earth compound is praseodymium hydrogen sulfate.

192-195. (Canceled).